



LESSON PLAN

Season 2/Episode 11

Make Instant Crystals (Investigating 'Snow')

Let's Find Out features Captain Zoom and her crew of scientists with exciting experiments, curious kids and a trip to a faraway place. Produced with support from Science Foundation Ireland.

Class Level:	Fifth/Sixth Class
Strand:	Materials
Strand Unit:	Materials and Change
Content Objective:	<ul style="list-style-type: none">• Explore the effects of heating and cooling on a range of solids, liquids and gases

Assessment Method(s):	<ul style="list-style-type: none">• Teacher observation• Teacher designed tasks and tests• Work samples• Self-assessment	<ul style="list-style-type: none">• Conferencing• Portfolio assessment• Concept mapping• Questioning
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Lesson: Make Instant Crystals

Lesson Introduction

- The teacher will begin the lesson using WALT and WILF.
- Question the children on their prior knowledge of Crystals.
- Click [HERE](https://www.youtube.com/watch?v=WXNr-89m7oM&list=Pler4jkNChuybHYhU-YSs5LW-TuLKz_SQk&index=17) for a whole class demonstration on the experiment.
(https://www.youtube.com/watch?v=WXNr-89m7oM&list=Pler4jkNChuybHYhU-YSs5LW-TuLKz_SQk&index=17)

Lesson Development

First, make some sodium acetate (Hot Ice) solution:

1. Place 100g of sodium Acetate trihydrate in a pan
2. Add approx. 25mls of water and begin heating slowly
3. Stir until all of the sodium acetate trihydrate has melted
4. Once melted, simmer for approx. 5 mins then transfer to a very clean pyrex jug
5. Place in the fridge to cool

Now you can make your crystals!

1. Put a small amount of solid sodium acetate trihydrate on a saucer
2. Carefully remove the sodium acetate solution from the fridge and place on a flat surface.
3. Dip a toothpick into the glass of water to wet the tip.
4. Then dip the tip of the toothpick into the solid sodium acetate trihydrate so some sticks to it.
5. Dip this end of the toothpick into the sodium acetate solution and watch what happens.

CAUTION: the solution may become warm when the crystals form - please do not touch the container.

6. If you want to repeat this again you can ask an adult to place the jug into a pot of hot water. Heat the pot of water on a medium heat until the solution is clear, and all the crystals have dissolved.
7. Ask an adult to turn off the heat and remove the jug.
8. You can then let it cool and start again.
9. If you repeat this many times, you may notice that the solution forms back into crystals as it cools. If this happens, simply add a half teaspoon of clear, malt vinegar to it, mix and return to step 4.

Lesson Conclusion

- Talk and Discussion
- Discuss children's observations

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Lesson: Make Instant Crystals

Resources	Methodologies	Linkage/Integration
Sodium Acetate Trihydrate (can be bought on Amazon) A small Pyrex jug A toothpick or wooden skewer A teaspoon measure Clear malt vinegar A glass of water	Talk and Discussion Active Learning Skills through Content Use of the Local Environment Problem Solving	Add in at teacher's discretion

Inclusion and Diversity/Differentiation (Differentiate at teacher's discretion)

Content:

Activities:

Resources:

Product:

Environment:

Teaching Strategies:

Scientific Explanation:

The sodium acetate solution has lots of sodium acetate dissolved in it. It has so much sodium acetate dissolved in it that it cannot hold any more, we call this a saturated solution. When we dip the crystals of sodium acetate into the solution it pushes the solution beyond its maximum and causes all the sodium acetate to come out of solution, in crystal form.

So why is it called 'Hot Ice'?

Sodium acetate has a melting point of 51°C and below this temperature it prefers to be a solid. However, when sodium acetate is mixed with water and melted it can remain as a liquid below its melting point. This is called a "supersaturated solution". If this supersaturated solution is then made to crystallise, its temperature rises to its melting point of 51 C immediately and solidifies. This is where the name HOT ICE comes from and sodium acetate is used to make hand warmers, applying this very same principle.

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